

G

GLYCERITE OF KEPHALINE, THE PHOSPHOROUS ELEMENTS OF BRAIN AND WHEAT.

The Glycerite of Kepheline is a solution of Organismal Hypophosphites, isolated from the brain of animals, fish, and the germinal portion of wheat.

As the Hypophosphites are obtained at a moderate temperature without the use of any agent that can in the least possible degree modify the formula of the Hypophosphites, they represent the Hypophosphites which are normal to the animal organism in the very formula in which vital functions require them.

This preparation has been used by hundreds of physicians in Tubercular Phthisis, Loss of Nerve Power, Decay of the Intellectual Faculties, as manifest in Failure of Memory, inability to fix and maintain the attention upon one subject, depreciated capacity for mental exertion, business, and even the ordinary details of life, Failure of the Sexual Desire, Neuralgia, Obstinate Vigilance, Restlessness, General Debility, with results far more satisfactory than obtained by any other agent. It will also prove useful in Difficult Dentition, Infantile Innutrition, the Backache, Toothache, and Trifacial Neuralgia of Women during Pregnancy and Lactation, but in these ailments it is inferior to "Protagon" and "Wine of Wheat." It benefits the above class of cases by supplying the phosphorous elements, upon the deficiency of which these maladies so frequently depend.

Dose from 10 to 20 drops, thrice daily, in water, wine or extract of malt. Incompatible with alkaline carbonates and mineral acids.

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GLYCERITE OF KEPHALINE,

THE

PHOSPHOROUS ELEMENTS

OF BRAIN AND WHEAT.

KEPHALINE is the name given to the precipitate thrown down, when a menstrum of alcohol, ether, bisulphide of carbon, tri chloride of carbon and butyric acid, previously saturated with the phosphorous principles of animal brain, is depressed to a low temperature. This must not be confounded with the phosphorized brain principles called *Kephalin* by Dr. Thudicum. The precipitate thus obtained, redissolved in butyric and acetic ethers, and carbonate of ammonium, is freed from its oleo nitrogenous combination, and the solution again chilled, throws down a phosphorous compound. This phosphorous compound treated with acidulated glycerine, saturates the glycerine with hypophosphites in nearly a chemically pure form. The inner shell of the white wheat similarly treated, also produced a phosphorous glycerite. Three parts of the brain phosphorous glycerite, and one part of the wheat phosphorous glycerite, constitutes the preparation we offer you under the name of the "Glycerite of Kephaline." This is not a secret or copyrighted nostrum, and the only advantage we can claim over any other manufacturer, is the skill which years of experience and experiment can alone impart. Isolated phosphorous compounds, although used by Dr. Charles G. Polk and a few physicians to whom he had given specimens of his preparations, for nearly twenty years, were not regularly introduced to the medical profession until November, 1876. At that time Dr. Polk's paper on "Protagon" was published in the "New Remedies;" an intense interest was awakened, and a strong demand for these preparations came from every section of the Union, as also from Canada. The high degree of satisfaction given by the agents as expressed in numerous testimonials, has assured the originator and manufacturer that the estimate that he placed upon the "Glycerite of Kephaline," has been more than realized by three-fourths of the physicians who have tested its value.

A brief history of the introduction of the Hypophosphites into medical practice, is not entirely irrelevant to the subject.

Dr. John Francis Churchill in 1855, after years of study of the ætiology and pathogenesis of tuberculosis reached the conclusion that Phosphorus existed in the animal organism in the formula of hypophosphites and phosphites, and the disease in every case had its origin in a deficiency of these forms of oxidizable phosphorus. Founding his therapeutics on this hypothesis, he manufactured and employed the Hypophosphites of Calcium and Sodium as remedial agents, and asserted that he had discovered in them an unerring specific for this hitherto incurable malady. A few months after Dr. Churchill had promulgated his doctrine, manufactured his Hypophosphites, and began using them as a remedial agent, a physician who had recently returned from Paris, familiar with Dr. Churchill's new doctrine and practice, attended a lecture by Dr. Polk on the physiology of the medulla oblongata, and its relation to the nutritive and respiratory functions. After the lecture he called the attention of Dr. Polk to the discovery of Churchill, and suggested that in the union of the doctrines of Drs. Polk and Churchill, a very plausible theory of consumption could be formulated. Dr. Polk's fondness for chemical research was thus turned into this channel, and the results we find recorded in the *Medical and Surgical Reporter*, August 2d, 1873, and referred to in the *Tennessee Pharmacal Gazette*, November, 1874, namely that the "medulla oblongata, cerebellum and base of the brain contained a very much diminished amount of hypophosphorous acid in combination with glycerine and fats in those dead with phthisis." It will be noticed that in both the papers referred to, Dr. Polk gives full acknowledgment to Dr. Churchill, notwithstanding a jealous enemy without the slightest ground for the assertion, has charged Dr. Polk of claiming Dr. Churchill's discoveries. Dr. Polk satisfied with Churchill's theory of tuberculosis, but not with the results he obtained by the use of

Churchill's Hypophosphites, determined to test the phosphorous principles as they exist in the brain of fish. The first case he recorded of the use of these brain Hypophosphites, bears date of May 10th, 1859. The result satisfied him of the immense superiority of the brain hypophosphites and since then he has employed them in every disease which is dependent on, or associated with deficient nerve power; and has freely given all his researches, discoveries and formulæ as the common property of the medical profession. Dr. Tilbury Fox several years ago introduced his "Wheat Phosphates" into medical practice, filling a different niche in therapeutics; these being of especial value in diseases of children consequent upon imnutrition and in pregnant and nursing women. We regret that these "Wheat Phosphates" have been imitated by several manufacturers, who have copyrighted their preparations, concealed the process for their production and advertised them in the daily secular papers and in the popular magazines, making them in every sense of the term secret and proprietary medicines.

From what we have stated, it appears that the honor of first employing Brain Hypophosphites belongs to Dr. C. G. Polk, and "Wheat Phosphates" to the distinguished London physician, Dr. Tilbury Fox, the author of an excellent treatise on "Skin Diseases."

But questions of personal rights little concern the physician in his conflict with disease and death. To him it is of small moment who discovered and introduced a therapeutical agent. He wishes the one which exerts the most curative influence upon disease irrespective of its author. In his experience with all previously employed agents in the treatment of the Tubercular Cachexia the results have been so unsatisfactory, that he may justly look with grave suspicion upon any agent put forth as the long sought for Balm in Gilead, capable of "stamping out Pulmonary Consumption." Churchill, in the hot enthusiasm of his discovery, can be pardoned for venturing such a claim, but in the realization of his unfortunate failure, with the sad record of all remedies and the unrestrained ravages of the fell destroyer, decimating one-fifth of the human race, we can only find such claims appended to secret and copyrighted nostrums, put forth by men sordid and mercenary, seeking to impose on human credulity and sport with human life, hoping to receive full compensation in gold and silver as the fruits of their cruel deception. From the first we have refrained from urging any such a claim for the "Glycerite of Kepheline." While we have often witnessed the most gratifying results, seen the hectic flush depart, the wan and emaciated form resume its rotundity and vigor, the cough and hemorrhages and diarrhœa terminate as it were by magic, often have we used our remedy even in conjunction with Extract of Malt and Cod Liver Oil without the slightest obvious benefit. At the present day it is only quack nostrums that stamp out consumption with unerring certainty. Glycerite of Kepheline does not attain the position of a specific, but we will endeavor to define its correct position as a therapeutical agent. As already stated, the Hypophosphites contained in this beautiful Glycerite, are all isolated from the brains of animals and fish, and the germinal portion of wheat. In the alembic of these organisms they receive a peculiar impress and acquire chemical and nutrient qualities, which the chemist has not yet been able to impart to the Hypophosphites prepared by the known processes in the laboratory. While it may be incorrect to say that they are vitalized, because all vitality terminates in the death of the organism in which the component parts have been elaborated, like pepsin, pancreatine and some other proximate principles, they are endowed with an especial adaptability and so constituted as to preserve and manifest their organismal value, after being extracted from the animal and plant and exert the same organismal properties as the phosphorous elements would and do exert in the various phenomena which collated constitute the physiology of man. Consequently we will term the Hypophosphites developed in plant and animal organisms, "Organismal," to distinguish these from the ordinary kind which we will designate as the laboratory made Hypophosphites. We then deny that any vitality lingers in these isolated phosphorous compounds, that outside of their chemical formula and the immediate adaptability of this chemical formula to vital functions they do not differ from other inanimate matter, but the Hypophosphite developed within the catalytic influence of a nitrogenous element, acquires a chemical formula other Hypophosphites cannot attain. Even the artificial oleo-hypophosphites Dr. Percy gives the formula for making in his Prize Essay partially acquiring through nitrogenous catalysis this chemical formula and approximates, the organismal Hypophosphites in organismal powers, uniting with nitrogen, olein, albumen and glycerine as bases. It does not require two units of water for its existence, and is comparatively bland in its action upon animal substances; the laboratory kind on the other hand cannot exist except in union with two equivalents of water, will not unite with oil or albumen, and can only form a simple admixture with glycerine, while with lime potassium sodium and with other alkalies and minerals it will unite with but a single unit. The difference between the ordinary Hypophosphites and the organismal kind we contend resides in their chemical formula, and the superiority of the isolated kind over the oleo Hypophosphites prepared by Dr. Percy's process resides in the immense superiority of the chemistry of the animal alembic over the imperfect imitations of man. In this alembic the Hypophosphites acquire the exact chemical formula and combination to sustain their relation as the pabulum and animating principle of

brain and nerve force, consequently when isolated from animal brain and administered to man, the stomach receives and the nutritive organs takes up these Hypophosphites without any further digestion; they are at once absorbed into the blood, or supply the chyme and chyle with the phosphorous principles, so inseparable, as will hereafter be demonstrated, from their vitalization and morphology to blood and animal tissue. The advantage which is embodied in this perfect adaptability of the organismal Hypophosphites is so obvious, that no argument is required to give it the position of an axiom. As the gastric juice requires phosphorous elements for the digestion of the albuminoid constituents of the food, the administration of these Hypophosphites imparts force and promptness in this part of the nutritive process. Facts hereafter to be presented, show that these elements hold as much the position of an essentiality in this process as Pepsin, Ptyalin and Pancreatin, beside stimulating the absorbents to more vigorous action, producing modifications in the blood and vitalizing the exudations of the liquor sanguinis. Being a normal component of the gastric juice, they strengthen and never irritate the stomach, acting as a calmative to an irritable stomach, often dissipating pain and nausea. In these characteristics they display properties very unlike those manifested by laboratory kind. The latter are in a formula foreign to the phosphatic constituents of body and brains of animals; before they can attain organismal attributes, they must undergo digestion and transformation to the organismal kind. In this transformation a large portion of the Hypophosphites are converted into non-organismal phosphates, incapable of displaying any nutrient character, and being foreign principles, are eliminated through the intestinal canal and through the kidneys. The evident result is that only a small per cent. of organismal Hypophosphites are appropriated by the system from large doses of the non-organismal kind. Clinical results sustain this conclusion, three or four grains of the organismal kind are more actively stimulate the nerve centre and manifest more physiological and therapeutical action than thirty grains of the non-organismal kind. Notwithstanding this transition must take place in every instance before the laboratory prepared hypophosphites can be employed in vital phenomena, we have strong evidence that the transformation does ensue. The organismal kind acts upon the nerve centres as a stimulant nutrient, while the other kind is far more tardy in the exhibition of their action. Moreover the impress upon the digestive organs is different. We have stated that the organismal kind is always welcomed by the stomach and never offend that organ, while on the other hand the non-organismal kind imposes a tax upon the digestive organs in producing the above transition beyond their capacity of endurance, producing gastric irritation, constipation of the bowels and torpidity of the liver. This unfortunate characteristic of these Hypophosphites is often so decided as to contra-indicate their employment, while the bland nutrient and yet active organismal Hypophosphites are exempt from these objections. This asserted superiority of the organismal over the non-organismal variety of phosphorous elements is not the mere conclusion of the enthusiastic discoverer, or the interested manufacturing chemist. Were it so, the motive might be impugned, but the fact has been so often observed by eminent men in the medical profession, that we are almost justified in declaring it an accepted fact.

Dr. George Tempini has declared that the only manner in which deficient phosphorous elements can be restored, is by a rich phosphorized diet.

Dr. Routh, of London, has no confidence whatever in the laboratory manufactured compounds, and declares that phosphatic deficiency in animal organisms can only be remedied by phosphorous compounds elaborated in a vegetable or animal organism, and for this purpose recommends a diet of eggs, fish and shell fish.

Dr. Griscom in his masterly paper: "*Phosphorus as an Organismal Element*," in the Transactions of the American Medical Association, 1864, proves that digestion, assimilation, respiration, and the vitality of the blood, are inseparable from the phosphorous elements, and he clearly recognizes the different organismal value of the two kinds of these elements.

M. Andre Sanson says, "the phosphates that are manufactured in the laboratory should not be used, because their form does not permit of their digestion and assimilation."

Dr. Tilbury Fox says: "There is something essentially special in the organized phosphates, in fact, that have been formed by passing through a living organism as compared with those artificially prepared. It is not the *amount* but the *kind* exhibited which produces the good result."

Dr. Charles G. Polk says on the 584th page of his elaborate imperial octavo volume: "*Tuberculosis, Its Causation, Lesions and Therapeutics*." "The line of demarcation between the characteristics of the living and the non-living is absolutely defined. Life is a mysterious unanalyzable principle, born of God, endowed with attributes Divinity can alone bestow. Every physical and every chemical process is subservient to its influence, modified by its impress, and can not be reproduced by the skill of man. He may determine the chemistry of every fluid and every solid, he may delve deep into the wonderful phenomena displayed by the vital principle in the various functions of plant and animal organisms, yet no revelation has come across the vast abyss, which intervenes between the finite and the infinite, by which the inanimate can be clothed with the habiliments and endowments of life. All the

physical and chemical forces of the animal are subject to a finer, yet more powerful principle, than any, which govern the operations of inanimate matter. The whole organized creation, and man in particular, display functions which inanimate matter cannot produce, and although physical actions are observed in their most admirable conditions, in the animal body, they are entirely subject to higher functions, functions blended with and inseparable from the vital principle. It is one of the chief characteristics of life, that it is allied to matter, delicately and peculiarly combined and differently constituted from inanimate matter. Life allied with material forms produces combinations entirely different from those, which the chemical affinities of the elementary particles dispose them to assume, and preserves these combinations in opposition to physical tendencies as long as it continues thus associated.

By a series of beautiful processes, it changes substances foreign to the constitution of the animal to which it is allied, and at last assimilates them into the organized structures which it animates. Thus nutrition and growth are produced, and the decay of the organized body is prevented. As Professor Paine has truly said, organic and inorganic nature are distinct in their most essential attributes, that each department is governed by laws and properties peculiar to itself, and that the organic being is fundamentally distinct from the inorganic, in its elementary constituents, in the aggregation of its molecules, in the structure of its parts, in its conditions as a whole, and in every phenomena which it evinces. Still, I believe vitality is after all, an attribute of matter, that it is impressed upon the granule, the cell, the protoplasm, and every elementary constituent of the animal organism. As the germ of vast forests may slumber in an acorn, so the vast races of men once dwelled in a spermatozoa, that life is latent, until awakened into action by its appropriate stimuli, and so intimately blended with chemical and physical forces, each modifying, and yet intensifying the other, that we can not reach an intelligible view, except in contemplating them in unison * * * * Organic chemistry is the chemistry of life, the consequences of molecular changes resulting from forces, not yet comprehended fully by the mind of man. We can learn the consequences of vital chemistry, but the skill of the chemist cannot reproduce them.

Pepsin, Pancreatine, Ptyalin and Bile, are familiar examples of the physiological elements of the animal organism, and their essentiality in digestion is fully recognized. While they have been isolated, analyzed, and their chemical elements determined, yet we cannot form them in the laboratory. So with the phosphorous elements of plant and animal life; they are in formula even difficult to determine and impossible it seems to produce. The brain Hypophosphites in their glyceric nitrogenous association, is so active, so oxidizable, so replete with nutrient and stimulant properties, that it almost approaches the character of a nascent form of phosphorus. Two or three grains of this Hypophosphite profoundly impresses the nerve centres and imparts enduring vigor to the forces which preside over the functions of animal and vegetable life. Several attempts to imitate this nitrogenous Hypophosphite has been only partially successful. Dr. Samuel R. Percy in his Prize Essay "Phosphorus," gives a formula for an imitation. He made it by saturating lard oil or cacao butter with phosphorus, adding beef juice to the solution, and decomposing the solution by oxygen. This is the "New Chemical Hypophosphite he had written about" and concerning, which he received over two thousand letters and not the Nitrogenous Hypophosphite which he admits in his Essay, he had not used as a therapeutical agent (see p. 658, *Trans. Am. Med. Association*, 1872, Essay "Phosphorus"). I have always tried to do justice to Dr. Percy, and I leave his opposite course to the reflections of his conscience.

An Eclectic Physician has produced a similar and I believe a better preparation, by decomposing the phosphorus by electricity.

I have experimented for twenty years in trying to form the same nitrogenous Hypophosphite, and believe my best success has been in a solution of Phosphorus added to glycerine, and decomposed by bin oxide of nitrogen. I have also produced a very active phosphorous compound by added phospham or phosphide of nitrogen to a mixture of glycerine and water. The process is very dangerous. All of these imitations are however far less nutrient than the nitrogenous Hypophosphite elaborated in an animal brain—no other phosphorous compound can compare with it in organismal and therapeutical value.

Entering as it does into the physical conformation of the nerve cell, and constituting as we will hereafter prove, the very pubulum of nerve life, and the animating principle of nerve force, the nitrogenous Hypophosphites is truly entitled to the appellation of the Protagon of the Nervous System. Dr. Francis Gerry Fairfield says: "So that as Dr. Lehman was the first to remark, it is tolerably certain that the development of structure in the amorphous protoplasm, is dependent upon the presence of a phosphorous trace in the compound, generally existing as a phosphate, but in the nervous system taking the hypophosphite form. The evolution of the phosphorous trace, and the development of the tendency to cell formation, always accompanying each other. The most common forms under which the former appears, in living tissues are the phosphates of lime and magnesia; phosphite of ammonia, potash and magnesia; nitrogenous and oleonitrogenous hypophosphites of ammonia, lime, soda, and with hypophosphite in combination with albumen, and hydrated hypophosphorous

acid in combination with oil." This enumeration of the phosphorized principles of the animal organism does not differ materially from that given by Dr. Griscom in his masterly paper on "Phosphorus as an Organismal Element" in the *Transactions of the American Medical Association*, 1864," a paper superior to anything yet presented on the subject. "It may be remarked that the Hypophosphites also exist in the blood, chyme, and chyle, and displays functions as inseparable from organic life in these, as it does to nerve and brain life, and activity in the nervous system. The more fully we expand our knowledge of the action of the phosphorous elements, the more fully we grasp in our comprehension their essential relation to vital phenomena; and all the manifestations of our psychic being, the more exalted will be our estimate of their nutritive value, their physiological importance, the more serious the consequences of their deficiency, the more importunate the demand for their restoration, and the more desirable contribution—a formula of phosphorus which presents an oxide in a condition assimilable, and ready for assimilation—this boon is only attained in phosphorized compound, isolated from a plant or animal organism; these alone meet all these requirements, and ward off the consequences of excessive waste of this element, the pathological importance of which I have endeavored to establish in this treatise. Dr. Churchill by demonstrating that the tubercular cachexia is the immediate consequence of deficiency of hypophosphorous acid in its alkaline and mineral associations in the human organism, made a very important advance in the development of correct ideas concerning the pathology of this hitherto unmanageable disease. As I have already proved 22.07 per cent. of cases permanently recover under the use of Churchill's Hypophosphites and Extract of Malt, while less than two per cent. are cured by the Cod Liver Oil, and only six per cent. by the Extract of Malt and Milk. Churchill, it is also seen, made a very valuable addition to its therapeutics. He here sprung a mine of scientific truth which has followed the sun in his diurnal road, until it has encompassed the entire limits of civilization and stayed in an important extent the devastations of this terrible malady in the cases in which it has been employed. Such an achievement transcends the greatest victory of the battle field, enrols the name of Dr. John Francis Churchill among the noblest benefactors of mankind, and base indeed must be the man who would pluck a single laurel from his brow. His discovery was thus announced in a number of Galigiani's Messenger published soon after, Dr. Churchill presented a paper upon his discoveries, and record of thirty-four cases of consumption, treated by Hypophosphites to the Academy of Medicine of Paris, July, 1857.

"An interesting paper on the successful treatment of this dreadful affection—Tuberculosis—and the allied diseases of scrofula, tabes mesenterica, etc., by the Hypophosphites of Lime and Soda, has just been presented to the Academy of Medical Sciences by Dr. J. F. Churchill. It has long been known that among the inorganic or mineral substances that enter into the composition of the body, phosphorus is to be met with in considerable quantities, *but chemists and physiologists are as yet unable to decide whether it is found only in phosphoric acid—that is in a state of complete oxidation, and as such no longer liable to be burned by the oxygen of the atmosphere (as, for instance, in the mineral matter of bones), or whether it also exists in a lower state of oxidation (as hypophosphorous acid), and as such capable of keeping up the slow combustion which constitutes one of the principal phenomena of life.* Opinions upon this point are very nearly balanced; the celebrated Liebig, for instance, stating that it is impossible to decide the question in the present state of chemical analysis.

"Dr. Churchill, by a series of scientific deductions, came, in 1855, to the conclusion that not only was it necessary to admit that phosphorus existed in the body in an oxidizable or combustible condition (as hypophosphites); but, likewise, that the proximate cause of, or at least an indisputable condition to the existence of consumption or tuberculosis, was the undue waste or deficient supply of this principle."

Dr. Churchill wrote Mr. Horace Greeley the following: "If, as I assert, the Hypophosphites be the specific remedy of phthisis, because one at least of the essential conditions of that disease consists in the want, or undue waste of the *oxidizable phosphorus* in the animal economy, it follows that consumption will be prevented simply by taking care to keep the system supplied with a due amount of that element."

From these quotations it does not seem difficult to decide whether Dr. Churchill announced in July, 1857, or Dr. Percy in May, 1872, the first declaration that the phosphatic nutrient of the brain and nervous system "is not a phosphate but a hypophosphite."

Dr. Polk further says in his "Tuberculosis." The importance of the phosphatic elements of food is well shown in the Extract I have given on p. 213, from the report made by Surgeon William A. Hammond (in Vol. X., *Transactions of the American Medical Association*) of the experiments he tried upon himself. That experiment most positively demonstrated, that while the starchy and carbonaceous constituents of food are the heat generators—the nitrogenous the tissue builders, the phosphorous principles are equally necessary to co-ordinate these to the purposes of nutrition. Dr. Hunt has truly said that "starvation is a comparative term. We can starve muscles by withholding nitrogen, we can starve the fats of the body by withholding carbon. So, too, we can starve the brain by withholding phosphorus, and starve the blood by failing to supply it with those salts of lime, potash, soda,

and iron, which are essential to its healthful condition. We know that when these are withheld, the blood globule becomes pale and irregular in form, and starvation diseases are produced."

In 1870 I reached the conclusion, by scientific deductions, unnecessary here to mention, that the ordinary phosphates produced in the laboratory were entirely inert as nutrients, and consequently could not be employed with success in restoring a deficiency of the phosphorous elements, or in supplying these elements in diseases which produce an excessive drain of them, as the abundant expectoration of bronchitis, catarrhal pneumonia, leucorrhœa, hæmorrhoids, abscesses, chronic ulcers, suppurating wounds, spermatorrhœa, frequently repeated sexual intercourse, and intense mental exertion, whether employed in purely intellectual labor or in the manifestations of intense emotions of love, passion, joy, and the agony of long continued grief. Having become convinced of the comparative inefficiency of these laboratory hypophosphites as medicine, I determined to subject them to practical test, to decide the accuracy or fallacy of my opinion. On the 5th of February, 1870, I placed three dogs in a kennel, gave them distilled water to drink. By water, alcohol and chloroform, I removed from their food all of its phosphatic principles, and then gave them all of this dephosphated food that they could eat. For the first few days I did not perceive any change in their condition. At the termination of the first week they began to show signs that their food had been deprived of a very important constituent. While they yet ate a large amount of food, it did not seem to be digested and assimilated; even with food by them, they expressed hunger and evinced loss of flesh. Evidences of imnutrition grew more obvious day by day.; they grew thin, haggard, whined and told of severe suffering. On the sixteenth day they were so much emaciated that I deemed it cruel to proceed further, having demonstrated with axiomatic certainty the correctness of Professor Horsford's aphorism: "Without phosphoric acid there is no life," and desisted. Upon their usual food they rapidly regained their former vigor. This experiment corroborated in its results the experiment by Professor William A. Hammond upon himself, that food deprived of its phosphatic constituents is incapable of supporting animal life. I further proved that laboratory made phosphates differ from those that enter the animal system through the natural elaboration of vegetable life, and consequently in cases of their deficiency cannot compensate for them. Impressed with the importance of this discovery, I renewed my experiment on a spitzer dog. While abundantly supplied with dephosphated food, he emaciated and grew sick. I then macerated the inner or fine bran with alcohol, ether, and bisulphide of carbon, at the temperature of 120° F., precipitated the phosphates by running the temperature down to 30° F., and gave him this precipitate with his food. He at once began to improve, and in four weeks gained flesh and was every way in better health than he was when I began to subject him to this ordeal. I proved by these experiments that ordinary phosphates are entirely destitute of organismal value, consequently it is utter folly to give them to supply any deficiency or compensate for any unnatural or excessive loss of the phosphorized elements.

The results attained in these experiments seem to me to be very conclusive of the vast chasm which yawns between the organic and the inorganic world; an evidence of the peculiar impress which that mysterious essence-life stamps upon all of its processes and productions. Science may feebly imitate, but she cannot evolve them. The chemistry of the laboratory is not the chemistry manifest in plants and animals. While the histologico chemist may determine the chemical forces displayed in the various vital phenomena, he cannot reproduce those forces in the laboratory.

But from the experiments I have here given, the following conclusions seem to be established beyond the possibility of contradiction.

1st. The Phosphorous elements hold a very important relation to nutrition. Food, however rich in its nitrogenous and carbonaceous constituents, cannot sustain animal life, because the force which determines its morphology into blood, replete of tissue elements is not exerted, consequently it cannot undergo the evolution to that vital organization it must attain, before it can be appropriated to the organization and reorganization of the structures of the various organs and tissues.

Hypophosphites, phosphites and phosphates, manufactured in the laboratory, being destitute of organismal properties, cannot compensate for the organismal phosphorous elements in the food of man and animals, and consequently should not be employed in pathological conditions in which phosphatic deficiency sustains the relation of exciting and of determining cause.

Phosphates, phosphites and hypophosphites isolated from animal organisms without chemical change, being in the exact formula normal to those organisms retain their nutrient and assimilable characters, and therefore supply those phosphorized principles in the very formula the human organism requires them, consequently they must meet absolutely and perfectly any deficiency of the phosphorous bases which may accrue from food deficient in its phosphatic constituents, or from excessive consumption or waste of these.

It is thus determined without phosphoric acid there is no life; that without it the food however abundant in quality, is incapable of supplying the nutritive functions, and conducting

those vital processes by which food is transformed into blood, and the blood is elaborated into living structures. But while the phosphates, phosphites, and hypophosphites are all indispensable requisites of digestion, seeming to hold a high office in the elaboration, and vitalization of the gastric juice, the part performed by the hypophosphites, holds the highest relation. Developing the nerve influence exerted by the great sympatheticus, and by the Medulla Oblongata through the pneumogastric nerve, the whole process of nutrition is in a large measure subservient to its power. The evidences I have presented, the experiments I have submitted, as made by Bernard, Brown Sequard, Hammond, and myself, it seems to me are positive proof that digestion, assimilation, secretion, in fact all the organic functions of animal life are in a large measure preserved in their normality, or thrown into abnormality through the nerve influence communicated from the Medulla Oblongata. If the Medulla Oblongata fails to transmit the adequate force, inadequacy of function must be displayed in the organs to which it is distributed; gastric digestion will be deranged, the pancreas and liver impaired in function; butyric fermentation will ensue, and the tubercular cachexia follow in the sequence. As stated in my consideration of the chemico-pathology of tuberculosis, the Medulla Oblongata contains but a very limited amount of phosphorus in those dead of that disease; a fact I first ascertained in 1857, and secured the publication of, in the "*Medical and Surgical Reporter*," August 2d, 1873, article "Phosphate of Iron," pretty much in the same way that laws which would be otherwise rejected are sometimes railroaded through legislative bodies in omnibus bills. Thus in a paper entirely irrelevant to the subject, I secured a reference to my chemico histological research in 1857. As already noted, my paper on Phthisis and its treatment by Isolated Phosphorous compounds, had already been rejected by the editor of the *American Journal of Medical Sciences*. * * * *

But all histological research and the results collated on every side grouped together, exalt the relation the phosphorous elements hold to body, brain and soul. It matters not whether we descend to the simplest organic phenomena, contemplate the grand evolution of thought, or raise our conception to infinite and penetrate the mysteries of eternal life; we cannot escape the ubiquitous consequences of the phosphorous elements. The protoplasm is regarded as the most elementary constituent of animal organization, the grand basis of all tissues, and the protoplasm is inseparable from the influence of sulphur. Even taking the granule as the morphological unit, we find sulphur associated with its organization, and intimately blended with its life and development. Yet tracing the morphological unit a step further, watching with the microscope, the wonderful revelations it unfolds to us, of the hitherto unexplored mysteries of life, we find even the granule depending upon hypophosphorus acid in its nitrogenous association for its development into cell organization and animated fibre. Place the blood plasma under the microscope, and add a trace of ammonium hypophosphite, and it will be noticed that the granules hasten to arrange themselves into corpuscles. Here we get another glimpse into the pathology of tubercles. Tubercles are either granular or corpuscular, are either a blighted granule, or an aggregation of granules—a white blood corpuscle. If then, as Lehman has asserted, and all evidence seems to corroborate, the development of structures into the amorphous protoplasm, cannot proceed without the vivifying influence of the phosphorous trace, modification in the quantity and quality of the phosphorous elements may so impair the morphological process of the granule or the corpuscle, as to destroy its vitality and favor its exudation into the adenoid tissue, there to abide and constitute a tubercle.

Accepting it as a conclusion, that hypophosphorous and phosphoric acids in their alkaline and mineral associations, as the emanators of the morphological phenomena evinced in the growth and development of animal life, the position is unassailable that they wield a predominating power over all nutritive, brain, and nerve processes, and display their efficacy in their normality or abnormality. If they be the organizers and tissue generators of the animal and vegetable kingdom, can we exempt them from the consequences of lesions resulting from nutritive deficiency. * * * *

It is then the phosphorous elements which maintain brain functions, and determine the psychic entity of man. These are the especial medium by which the immaterial essence mind, and the unanalyzed and mysterious principle life are blended with material organisms; by which the soul inhabits the tenement of clay, by which the brain thinks, reasons and feels, or by which the morphological unit is developed from chyle transformed into cells, and elaborated into organs and structures. These are then the motor power of the soul, the connecting link between the finite and the infinite—the fountain of all brain phenomena, as also the supervisor and director of organic functions. Without them there can be no physis phenomena, and without them animal life cannot endure, blending as they do, in the sphere of their action the developing principle of all nerve influence, whether manifest in the philosopher's thought the devout offering of the saint, the melting passion of the lover; the eloquence of the forum, or in the performance of organic functions. They generate the power by which the heart beats, by which the stomach digests the albuminous food, by which the pancreatic juice is elaborated, and the oleaginous portions emulsified and prepared for further morphological processes.

Phosphorus, as an elementary constituent of the human organism endowed with these high offices, cannot do other than wield a direct and decisive influence over the normality and abnormality of every vital phenomena."

If, as Churchill declared and Polk confirmed, tuberculosis be the consequence of deficiency of the hypophosphites, the natural inference is, that the hypophosphites should at least remedy the primary lesions associated with this malady. For this purpose they no doubt are adequate. But the removal of phosphatic deficiency must be accomplished before secondary lesions ensue. As Polk has proved the deposition of tubercle in the lung, parenchyma would not be such a formidable consequence, if the tubercles retained their original form and structure. It is in the changes that they usually undergo that serious disintegrations are produced. He says "Chronic Pneumonia is the destroyer of nearly all phthical patients—the consequence is more terrible than the cause, the constitutional cachexia slowly yet surely exhausts the vital powers; the pneumonia awakened by tyromatous tubercles, damages and destroys the respiratory apparatus, poisons the blood, awakens the hectic phenomena, and hastens the event to its close." The office then to be assigned to the hypophosphites, is the arrest of the tubercular process by supplying the nerve masses which preside over digestion, assimilation, respiration and calorification with their proper pabulum. If the nerve force be all that perfect health requires, these functions will be performed properly; healthy granules and leucocytes will be created, and the integrity of the organism in the absence of other maladies is preserved; the pancreas elaborate sufficient pancreatic, so the pancreatic deficiency of Dobell is not encountered, the oleaginous starchy and carbonaceous constituents are emulsified or transformed into glucose, consequently there is no butyric fermentation, and the acid condition so graphically described by Bennett is not developed, the organic nervous system receives its necessary supply of nerve pabulum, and there is none of the depressed organic nerve influence described by Copland, and without these there can be no tuberculation. Consequently the administration of the Organismal Hypophosphites will arrest the disease in ninety cases out of one hundred at the beginning. And there is no doubt that even after the lungs are stuffed with tubercles, if given before fatal lesions have already ensued, they will permanently cure about 40 per cent., if the pneumonic lesions be skillfully combated. As pneumonia constitutes the great source of mortality of phthical cases, the pneumonia should ever be regarded as a lesion of deep concern. Its successful management is now a more intricate problem than even that of the tubercular cachexia. However, if the system be supplied with all the hypophosphites it requires, the butyric fermentation be remedied, the pancreatic juice elaborated in a natural amount, the disturbed relation between the nitrogenous and carbonaceous elements of the food restored, very much will have been secured towards curing the secondary lesions. This is more successfully accomplished by hypophosphites, lactopeptin, and extract of malt, than by any remedy or assemblage of remedies yet tested. The secondary lesions require individualization of cases. For the pneumonia, "Firwein" has proved very valuable in a large number of cases. Yerba Santa is highly recommended, and several cases reported as successfully treated by it in a paper on "Pneumonic Phthisis" in the "*Physician and Pharmacist*," August, 1877.

We have proved the greater assimilability of the Organismal over the Non-Organismal kind of Hypophosphites, called attention to their therapeutical superiority. We know this is claiming very much, for the Non-Organismal kind have indeed proved a blessed boon to mankind.

Dr. Taylor in his report on Hypophosphites, says: "The introduction of these hypophosphites into the blood produces a glowing influence—as a respiratory excitant, expanding the chest; as a pyrogenic increasing animal heat and nerve force, and removing erratic pains; and as a hæmatogen, forming a nucleus for the rallying of red globules; it increases appetite and cheerfulness, and controls expectoration, night sweats, and diarrhæa."

Dr. Percy summing the results with them, says: "Dr. Churchill, of Paris, in his treatment of consumption, proves beyond a possibility of contradiction, that with the simple hypophosphites of the alkalis, over 50 per cent. were cured. Dr. Bennett and Dr. Williams confess the same results and with cod liver oil, the cures did not amount to 2 per cent. Dr. Churchill with his imperfect hypophosphites, has made a great revolution in the treatment of consumption; with the perfect organismal Hypophosphites, physicians have reported better results than have ever been claimed for any other remedy. I have received numerous letters speaking in the highest terms of the Organismal Hypophosphites, as a curative agent in consumption."

Dr. Thorowgood, physician to Hospital for Diseases of the Chest, Victoria Park, London, says: I have administered hypophosphites, with a view to increasing and restoring wasted nerve force in an exhausted state, of which I believe many cases of consumption to have their origin. Such experience as I have had, leads me to think with some others who have made a careful trial of the hypophosphites in consumption, that these salts are certainly to be regarded as a valuable remedial agent in the treatment of this disease, especially in its premonitory and early stages.

The following from the Practitioner is even stronger testimony. "In many cases of chronic tubercular disease, we have found the medicine (the Hypophosphites) a most valuable one; more generally useful than any other drug we have employed for the last ten years. In cases of consolidation of the lungs of a chronic kind, we have found the hypophosphites unsurpassed. In some cases, in children of this description, their effect is, as Dr. Eustace Smith says in one of his lately published lectures in the *Medical Times and Gazette*, almost magical."

The clinical record of the Organismal Hypophosphites, even exceed the very favorable ones given by the ordinary kind. A few of these are here offered as samples of many hundred letters, declaring their immense superiority over the ordinary hypophosphites.

Dr. Geddings, in charge of the Sanitarium, at Aiken, S. C., says he has used the Glycerite of Animal Hypophosphites with satisfactory results in thirty cases of phthisis. He believes isolated hypophosphites superior to the usual remedies.

Dr. Edwards, editor of the *Virginia Medical Monthly*, has witnessed very satisfactory results with Glycerite of Kepheline in the case of a distinguished divine, suffering from nervous prostration, from overwork.

Dr. King, of Louisburg, N. C., says: "I am convinced by the therapeutical results, that isolated phosphorous elements form the most powerful nutrient tonic known."

Dr. C. W. Williamson, of Philadelphia, says: "Glycerite of Kepheline is surely a great chemical and therapeutical triumph. During the past five years I have used it in phthisis, dyspepsia, sexual exhaustion, and broken down conditions of female health, and so excellent has been the result, that I would not now know how to do without it."

Prof. Pepper, of the University of Pennsylvania, says he has found "Glycerite of Kepheline" a good nutrient tonic.

Dr. Polk, in his "Treatise on Tuberculosis," tabulates the results in over a thousand cases of phthisis treated by isolated phosphorous compounds, and arrives at the conclusion that they will permanently cure nearly 40 per cent. in the earlier stages; will apparently cure seventy, but the disease will return in thirty; that in the advanced stages with malt, sulphuric acid, and wild cherry bark, they will prolong life, maintain the strength, and render the last weeks of existence more comfortable.

Dr. F. O. St. Clair writes that he has found the Organismal Hypophosphites "a remedy of unequivocal and positive value in phthisis.

Dr. R. D. Winsett, Corresponding Secretary of the Tennessee Medical Association, says: "I have long used Churchill's Hypophosphites, and learned to value them highly, notwithstanding in some instances they deranged the stomach and interfered with digestion; since the Organismal Hypophosphites were introduced into medical practice, I have entirely abandoned the former, and now rely almost entirely upon the latter. I believe these Organismal Hypophosphites, given before the supervention of cheesy pneumonia, will cure a large per cent. of consumptives, but my own case furnishes a melancholy example of their inability to overcome the lesions which ensue from the caseous degeneration of inflammatory products."

Dr. Charles Payne, of Michigan, says: "The results obtained by the use of the Organismal Hypophosphites (made by Dr. Polk's processes), as observed in twenty-three cases of pulmonary consumption, justifies me in endorsing their value as therapeutical agents, deserving a high degree of confidence. I believe if given with Læflund's or Tilden's Extract of Malt, that they will cure a very large per cent. of cases in the first and second stages, while in the third they will keep up the strength, secure rest and prolong life."

From the quotations from Dr. Polk's Treatise on Tuberculosis, the extracts from other sources and the evidences of physicians who have employed hypophosphites, elaborated in a vegetable or an animal organism, as also those manufactured in the laboratory, the results must be accepted as conclusive evidence that both varieties of hypophosphites are agents of positive efficacy, and supply a place in therapeutics hitherto unattained by any agent or combination of agents.

The relative value of the two kinds, however, is more mooted. Many physicians who have witnessed such unequivocal advantages from the Hypophosphites of Churchill are reluctant to believe that any other form of phosphorus could be so safe, so nutrient and more rapidly supply the phosphorous elements to the system. Dr. Churchill asserts that his Hypophosphites will cure 50 per cent. of consumptives. They may do it in France but Polk tabulating the results in a hundred cases of consumption treated by him with Churchill's Hypophosphites, and other records shows that the permanent cures are less than 23 per cent. On the other hand he shows that out of nearly eleven hundred cases treated by himself and others with Glycerate of Kepheline four hundred and thirty-two regained a comfortable degree of health. Wishing to avoid any direct or indirect misrepresentation we will add, that as Dr. Polk individualizes, every case requires absolute rest during febrile and inflammatory conditions, and treats these conditions with calomel, camphor, quinine and opium, uses counter-irritation freely when there is pain or soreness, enjoins out-door exercise when there is no active inflammatory or febrile symptoms, and

always combines his Kepheline with Loefflund's Extract of Pure Malt or Malt and Hypophosphite of Calcium. He does and always has deprecated the idea that Hypophosphites, whether organismal or non-organismal, can be considered as approaching the claim of a specific at any and every stage of the disease. Yet he has a very exalted opinion of the efficacy of the Organismal Hypophosphites not only in combating the developed disease, but also as a prophylactic against its occurrence or origination. But no one in the profession is so insane as to suppose that the mere administration of any medicine can entirely eradicate the consequences of bad hygienic surroundings, improper or insufficient food, moral and social surroundings. The scientific physician encompasses all these in the contemplation of the disease and its management. Kepheline will no doubt do far more than any other medicine in overcoming any latent predisposition, but he wishes it positively understood that nutritious food, sufficient clothing, pure healthy air, properly regulated, out door exercise is of more importance than all the drugs in creation. He entertains very grave suspicions and strong doubts against all remedies heralded as specifics, capable of "stamping out consumption," even when the advertisement is simultaneously found in both medical and secular periodicals.

Kepheline should always be given with Extract of Malt and WINE OF PANCREO PEPSIN, so as to counteract the generation of butyric acid in the stomach and duodenum.

While we dislike to be invidious in the choice of the brand of Malt Extract, the corroboration by physicians of our statements is desired, we believe some of the American brands to be worthless. While we know at least two scarcely inferior to the German Malt prepared by Loefflund and sold by Mr. Albert C. Dung, 61 Bowery, New York City. The preparation has been carried to a very high degree of perfection, and is all a preparation of Barley Malt can be made. This malt has been recently combined with cod liver oil, and far exceeds any emulsion of the oil we have ever seen. We do not think it can be surpassed. When the pure malt is taken into the stomach it emulsifies the oleageneous portion of the food, transforms the starchy elements into glucose, and effectually remedies butyric fermentation, and consequently prevents the formation of butyric acid in the small intestines.

Next to tubercular consumption, the efficacy of the "Glycerite of Kepheline" is manifested in Nervous Prostration, consequent on exhaustion of the blood and nerve centres of their proper pabulum. A writer in the *Medical Brief*, in August 1878 says, nervous exhaustion expresses itself in various languages, as loss of memory, impaired concentration of thought, decay of the intellectual faculties in general, sleeplessness, neuralgia, hyperæmia of the brain, diminished physical powers, morbid sensibility of the cutaneous surface, loss of virile power, nervous dyspepsia, cerebral paresis and locomotor ataxia. This array of maladies brings to our mental vision, a large number of pathological conditions and requiring quite a variance in their hygienic and collateral treatment. A number of causes may lead to the consequent loss of phosphorous elements, and each case will require especial direction under the care of a judicious physician. Of course, the cause of the nervous prostration must be sought out, and removed; if from excessive mental exertion, he must have rest; if from cares, grief or anxiety, if possible the mind must be diverted from these; if from insufficient or improper diet, he must have plenty of nutritious food, eggs, oysters and milk, and if from sexual excesses, continence must be observed, items which will suggest themselves to the physician."

To attribute all the above maladies to nerve exhaustion may seem rather fanciful at a glance, but an examination of the subject corroborates the claim.

In the course of a paper upon the result of overwork, read before the London Medical Society, Dr. Routh said: "The symptoms of mental decay resemble the gradual change that come over old people, and yet are very similar also to those induced by venereal excesses in both sexes, except that in the latter there are symptoms of spermatorrhœa, which are absent in cases suffering from overwork. In both cases the tendency is to the production of idiocy from softening of the brain and insanity. He said there was reason to believe that the immediate cause of these symptoms was deficiency of phosphorus in the brain, and endeavored to prove this, by considering seriatim the following points: 1st. It is proved chemically that a man grows older, and mentally weaker, as the brain contains less phosphorus. This was shown by the analysis of Hentier. 2nd. The solidity of the brain in a measure depended upon protagon, a phosphoric compound, and those foods which were richest in phosphorus were found by experience to renovate most speedily weakened brain power, such as shell fish and fish generally. "The Doctor," Dec. 1st, 1872.

Dr. Edward C. Mann, says: the pathological phenomena discovered in the brains of persons dying insane, all have for their basis, interference with the due nutrition, growth, and renovation of the nerve cell, which by interrupting the nutrition, stimulation and repose of the brain, essential to mental health, results in the impress of a pathological state in the brain, and disordered mental function." This is high American authority corroborating the testimony of very high English authority.

It is a universally admitted fact, that intense study, mental excitement, strong passions and deep grief produce an increased amount of phosphates in the urine. This fact proves

that the hypophosphites are largely consumed in every mental operation, sustain the position of an essentiality in every brain and nerve phenomena, and justifies the aphorism of Liebig "without phosphorus there is no thought." It then assumes the position of a corollary that if phosphorus is so important to nerve vigor, that any deviation from the normal amount must modify nerve function and healthy brain, and nerve life are incompatible with a deficiency. To supply any deficiency no agent compares with animal hypophosphites. They give the brain and nerves their pabulum in the very form in which phosphorous elements are required, and in the absence of organic disease will give very prompt relief.

"Neuralgia, as Dr. J. S. Jewell has said, is very largely a disease of innutrition, or insufficient supply of food—the nerve cell seems to become exhausted of its proper pabulum, and irritation and pain follows." One of the most prolific sources of neuralgia is defective nutritive supply. But few conditions are more common than this. How often do we find cases in which by reason of privation of food or disease of the digestive organs, which impairs the appetite, or if not so, digestion and hence disturbs the digestive process, and vitiates its results, or where by choice, or habit unsuitable, or innutritious food is taken, and hence in one way or other from the side of supply, anæmia is produced. Dr. Jewell also refers to the same consequences resulting from excessive discharges, in which there is always a heavy loss of the phosphorous elements. In fact, all research into the pathology of neuralgia seems to sustain Romberg in his declaration that, neuralgia is but the cry of the hungry nerve for blood, or rather its own proper pabulum, the Hypophosphites in their oleo and glybero-nitrogenous association. Many cases of this disease which had defied all the usual remedies, yield in a few days to the animal Hypophosphites. It is a good plan to employ it in a very large per cent. of cases.

Dr. Spencer used Hypophosphites of Soda for the neuralgia of pregnancy, and Dr. Polk has found the "Organic Phosphates" to give relief in a large number of cases.

"Additional evidence," says Dr. Carpenter, "for the belief that the functional activity of the nervous tissue involves disintegration of its tissue by the agency of oxygen is found in the increase of *alkaline phosphates* in the urine when there has been any unusual demand upon the nervous power.

"No others of the soft tissues contain any large amount of Phosphorus; and the marked increase in these deposits, which has been continually observed to accompany long-continued *wear* of mind (whether by intellectual exertion or by the excitement of the feelings), and which follows any temporary strain upon its powers, may be fairly attributed to this cause.

"The most satisfactory proof is to be found in cases in which there is a periodical demand upon the mental power, as, for example, among clergymen, in the preparation for and discharge of their Sunday duties. This, when the demand for mental exertion is severe, and especially when there is that state of excitability of the nervous system which is frequently co-existent with a diminution of its vigor, is found to be very commonly followed by the appearance of a large quantity of the alkaline phosphates in the urine. And in cases in which constant and severe intellectual exertion has impaired the nutrition of the brain, and has consequently weakened the mental power, it is found that any premature attempt to renew the activity of its exercise causes the reappearance of the excessive phosphatic discharge, indicative of an undue waste of nervous matter."*

Take again the disease known as *spermatorrhœa* (by this term I include all those disorders which are primarily dependent on an abnormal loss of semen); it furnishes us with additional evidence that excessive waste of Phosphorus is inimical to physical and mental vigor. The spermatic fluid is rich in Phosphorus, and its emission from the system, *in whatever manner produced*, is, when *excessive*, highly injurious. The nervous centres being deprived of their proper pabulum, fall into a state of exhaustion, and the effects ultimately produced in the economy are the same as those that we see resulting from overwork and excessive mental strain. A morbid condition is set up in which a general loss of nerve-power is manifested. Definite forms of functional disorders, such as *cerebral* and *spinal paresis*, neuralgia, epilepsy, melancholia, etc., are induced, and if these are neglected, structural changes are soon developed, leading to softening, paralysis and death. It is very remarkable that the phenomena of disease present in these cases of seminal waste should so closely resemble those induced by *mental strain*, although in the former they are usually more pronounced, more exhausting, and more serious. Premature failure of mental power, loss of memory, irritability, nervousness, and extreme depression, are common to both. We conclude, therefore, that *dephosphorized blood* is incapable of supporting the nutrition of the cerebro-spinal centres, and that functional disorders frequently result.

In relation to this subject, it may be mentioned that it is a well-known pathological fact that sexual excesses (in which nervous excitement and overwrought emotions are added to the material loss) are, for the same reason, productive of general loss of mental and physical power, as well as of diseases affecting the organs of respiration and circulation.

"I am convinced," says Mr. Acton (whose opinion on this subject may be taken to be of some weight), "that many of the most obstinate as well as obscure diseases which the medical man meets with, arise from repeated loss; and I am no less certain that hypochondriasis, various forms of indigestion, debility, and nervous affections, arise from the same cause."

"Any warning against sexual dangers would be very incomplete if it did not extend to the excesses too often committed by *married persons*, in ignorance of their ill effects. Too frequent emissions of the life-giving fluid, and too frequent sexual excitement of the nervous system are in themselves most destructive."

The practice is certainly often continued until health is seriously impaired; and when the patient is at length compelled to seek advice, he is shocked to learn that his sufferings arise from excesses unwittingly committed.

Dr. Cotton says: "Of all vices, however, none are more apt to lead on to consumption than the unnatural or unrestrained indulgence of the sensual passions. To this cause alone the germs of tubercle are very frequently traceable; and I am convinced that the many bearings of this subject upon physical and mental energies have a much closer and more frequent relationship to phthisical affections than we can ever expect, from their peculiar nature, to see fully demonstrated."

Polk says "The evidences of the connection between excessive loss of seminal fluid and the evolution of tuberculosis are so abundant and conclusive, that the direct relation between cause and effect must now be accepted as among the entities of medical science. The chemical analysis I have made of seminal fluid however explains the manner in which the consequences are determined; it contains no less than 4 per cent. of Zoaline—the alkaloidal Hypophosphites having nitrogen and glycerine for a base. The excessive drain of this fluid robs the nerve centres of their pabulum; brain nutrition is inadequate, the nerve centres are starved—that morbid condition of nerve cells described by Dr. Edward C. Mann is produced."

If the effect falls upon the cerebrum insanity ensues, if upon the Medulla Oblongata the nutritive, respiratory and circulatory functions suffer—the protoplasm elaborated is of a low degree of vital endowment, the integrity of the various tissues is endangered, general relaxation of the capillaries ensues and the devitalized granules and leucocytes may exude into the lung tissue and constitute a tubercle, and lead to lung disintegration. But in those cases, in which the loss of seminal fluid produces insanity, the records of all insane asylums show conclusively one fact, ninety-five out of every hundred insane from seminal loss die of tubercular phthisis. In contrast to this the fact is significant that those insane from other causes are remarkably free from consumption, notwithstanding the confinement which necessary restraint imposes, and the hygienic surroundings in many asylums are very inimical to health, in fact predispose to this malady."

Nervous Dyspepsia, or, as it is more frequently termed, atonic dyspepsia, is a very frequent expression of nervous exhaustion. The aberration in the digestive functions being but a sequence of diminished nerve power or modified nerve power furnished by the Medulla Oblongata and the Great Sympatheticus. If this nerve power be diminished in quantity, or abnormal in its character, the functions over which it presides cannot maintain a vigorous or healthy state. In the deranged dynamic condition of the ganglionic nervous system the whole process of nutrition deeply sympathizes. Pepsin is not furnished in sufficient amount to digest the albuminous constituents of the food, the pancreas fail in their part in the work, the liver shares in the general atony of the chylipoietic viscera and that indescribable, unanalyzable, yet fully realized vital principle is feebly displayed. Moreover physiology teaches us that under the guidance of the nerve force, the various tissues possess the power of electing to themselves the material of their own nutrition, from the nutritive blastema supplied by the blood, and under the same guiding power we have the blood itself deranged, and this derangement reacts upon the nerve centres, thus compounding the morbid phenomena and inducing a torture more agonizing than the pangs of physical pain. But, moreover in addition to the consequences directly emanating from the modified or diminished nerve influence transmitted by the Solar plexus and the Medulla Oblongata, the experiments by Prof. Hammond on himself and Dr. C. G. Polk on dogs, prove beyond the possibility of contradiction that the phosphorous elements are chemically and vitally concerned in digestion and assimilation, that the nitrogenous and the carbonaceous constituents are incapable of supporting nutrition if the phosphorous elements be not also present. But nervous exhaustion, however, is nearly always the consequence of an expenditure of the phosphorous principles, exceeding that supplied or assimilated from the food. This deficiency may result from the food containing too little phosphorous, or in consequence of the nutritive system failing to assimilate the necessary amount from the food. It is true a proper diet contains all the phosphorus that an animal organism requires while health endures. Polk, however, has demonstrated that butyric acid in the stomach and duodenum prevents the assimilation of the oxides of phosphorus. He further showed that butyric acid administered to an animal rapidly loaded the urine with phosphates. Rouissin has also showed that butyric acid robbed the metalloïd phosphorus of all its chemical phenomena.

It being desired to examine a fermented mass of sugar, milk, coffee and bread, for phosphorus, all reactions, even with the Mitcherlischen apparatus failed. Roussin, however, found that the free butyric acid masked the evidences of the presence of phosphorus; for when this was neutralized by potassium bicarbonate, testing in the Mitcherlisch apparatus afforded very evident proof of the presence of phosphorus" (*New Remedies*, Page 352, April, 1873).

From this evidence it is unphilosophical to expect that any preparation of phosphorus can display its physiological action while this condition exists. The vital aberration, deficient nerve power, in which butyric fermentation has its birth and must be removed. This is a consequence of deficiency of Organismal Hypophosphites. But we find the butyric acid at the very gate way to the system, barring the entrance of the phosphorous elements from the food. It must be removed; the extract of malt removes this, hence it should always be given in conjunction with the Organismal Hypophosphites.

The same results can be obtained by cod liver oil and propylamin in combination about as well. Very much of the value of cod liver oil is in correcting this acid condition by improving the digestive process, and the prevention of the deranged relation between the oleaginous and albuminous constituents of the food. Consumptives rapidly grow fat upon it, even while extensive tuberculous infiltration is taking take in the lungs and the disease rapidly undermining the very citadel of life.

There is, however, another source of phosphatic deficiency beside that in which there is not enough of those elements introduced into the system. The incoming amount may be sufficient, while the outgoing quantity may be excessive. This latter condition may be brought about by overtaxing the brain by prolonged and intense study, by long continued grief, by tormenting passions and depressing emotions. All these consume, as Dr. Carpenter has shown, the phosphorous elements of the human organism, and thus rob the nerve centres of their animating principle.

There is another condition which Dr. Polk has pointed out, but which seems to have been overlooked by other students of the organismal relation of phosphorus—it is this—the nerve cell frequently becomes exhausted, so that notwithstanding the blood may convey to it enough of its pabulum for nerve nutrition, it is not appropriated just as a starved stomach becomes incapable of digesting food. The remedy for this trouble is Damianain conjunction, with small doses of phosphorus. The two agents act upon the nerve cell as Quassia and Colombo upon the stomach, and thus enables it to assimilate its animating principle and perform its multitudinous duties. "Frequently, says Dr. Polk, have I employed the two agents in cases in which the phosphorous compounds had failed to be of advantage. I cannot now recall a single case in which the result was not in a high degree satisfactory; the phosphorous compounds were assimilated and fully manifest their physiological action. Damiana, I mean the genuine article imported by Dr. St. Clair, is one of the most positive nerve tonics in the reach of the medical practitioner."

Whenever the system is temporarily jaded by overwork, wearied by unusual or excessive mental effort, or suffering under exceptional nervous exhaustion from any cause, the organismal Hypophosphites will be found to be a useful remedy. In such cases its exhilarating and restorative effect is well marked. It quickly produces a remarkable sensation of *bienetre*, of comfort and a manifest increase of power. It gives to the weary brain not merely a fillip but material support with increased capacity for renewed exertion while it restores the animal spirits.

Dr. Russel Reynolds says on p. 98, Vol. II, *System of Medicine*. "The Hysteric state, is essentially one of mental perturbation, and it is brought into existence, if not inherited, by those conditions which are most active in producing disorder of the mind: in the male sex by worry, anxiety, overwork, late hours, accidental injuries, and dissipation; in the female sex by vexatious emotions, want of sympathy or success, disappointed or concealed affection, want of occupation, fear, and morbid conditions or supposed morbid conditions of the reproductive system. . . . It would appear that the nutrition of the whole nervous system is changed, but that change is of such a kind that it passes beyond our power of recognition, except in its physiological or pathological effects. We cannot see degeneration of tissue here or too rapid metamorphosis there, but we can witness the effects of such morbid processes in movement, in secretion, and nutrition, and we observe some of the ultimate results of such changes in emotion and sensation."

Inasmuch, therefore, that in its multitudinous manifestations, hysteria is a direct expression of exhausted vital power, the inevitable indication is the restoration of the element upon which the vital power depends, hypophosphorous acid in its glycerio-nitrogenous association with such mineral tonics as experience has proved to invigorate the nervous system as zinc, silver and iron.

Dr. Polk says: "Nervous exhaustion is the direct outgrowth of modern civilization, and especially of the hurry and feverish excitement in which the American nation exists. Too many hours are devoted to action, and too few for repose and amusement. From morning until night we tax our energies to the utmost, and in the many artificial wants we create and the unnecessary anxieties we undergo, cell disintegration exceeds reparation, and the

nutrition of the brain and nervous system is impaired; the phosphorous elements are largely consumed; the functions they perform are enfeebled; the capacity for brain action is impaired; the memory becomes treacherous; the faculty of attention is weakened; the temper peevish; sleep is either disturbed by unpleasant dreams, or obstinate vigilance is produced; often digestion is deranged; the stomach fails in its office, and the food causes inconvenience. These results are especially common among literary men, ministers, lawyers, physicians, authors, and students. They rob the brain of its proper pabulum, and pay the penalty in unnumbered woes. The remedy is obvious—the restoration of the deficient phosphorous elements.”

Dr. Landon B. Edwards, the accomplished Editor of that *par excellence* journal, *The Virginia Medical Monthly*, says in an editorial note on page 789, Feb., 1878: “Decay of the teeth during pregnancy and lactation are too frequent in practice to require reports of the cases to establish the facts. Analyses of the blood in such cases show that phosphorous principles are in excess in this fluid, while they are diminished or altogether wanting in the urine. The legitimate inference from these and other familiar facts, is that the excess of the phosphorous elements in the blood go mainly to the fœtus in the one instant, or enters into the formation of milk in the other. In either event the mother suffers for want of phosphates for her own system. In other words, the excess of the phosphates found in the blood of the pregnant or nursing woman is not intended for her at all, it is for the fœtus or the infant. The amount of phosphates essential to a healthy adult is thus diminished, and the mother’s system bears the effect of this loss. These phosphates enter largely into the structures of the bones and teeth. There is then a direct loss of the bone forming substance in the system during pregnancy and lactation. Reflex sympathy as explained by Dr. Grant, may cause the effect to be felt more by the teeth than other structures, but the irritability itself is most probably due in the majority of cases to the loss of the phosphates. Our attention has often been directed to this subject, and Professor J. S. Wellford, of this city, has for some time been making observations which he proposes to publish. This irritability of the trifacial nerve and the decay of the teeth due to pregnancy, can in most cases be prevented by a systematic treatment by the phosphates.”

The deductions and conclusions from what we have stated may be reduced to the following summary:

Phosphorus in some one or other of its multitudinous formula constitutes an important element in every organ structure and fluid of the animal organism, and is scarcely less ubiquitous in plant life. It is the animating principle of the brain and nervous system and further sustains a very important relation to nutrition, secretion, and procreation. That the solidity of the brain and the manifestation of its functions depends upon the presence of a requisite amount of protagon; if the protagon be consumed in intense study or in deep and continued emotions in a greater amount than it is extracted from our food, brain integrity must suffer both in function and structure.

Dr. G. Temptini attributes cerebral paresis to loss of protagon (*N. Y. Med. Journal*, Jan., 1873).

In nervous dyspepsia the Organismal Hypophosphite are deficient in amount in the system, the Pneumogastric and Great Sympatheticus do not convey the amount of nerve force to perfect the processes of digestion. In the absence of sufficient nerve force the muscular action of the stomach is enfeebled, the gastric juice is deficient in amount and not adequately vitalized for its offices, the pancreas pour out less pancreatine, dyspepsia often supervenes from the phosphatic deficiency and from no other cause or aberration.

Neuralgia often has its prime factor in deficiency of the phosphorous constituents. The disease being, as Romberg has expressed it, the cry of the hungry nerve for blood, or rather its proper pabulum, the phosphorous elements essential to its nutrition and structural integrity. Such cases will yield promptly to the Glycerite of Kepheline. Many cases of neuralgia, however, have other determining causes, as malaria, uterine displacement, morbid condition of surrounding tissues, structural lesions of the nerves and anæmia. These will require other remedies, but in these, Kepheline will prove of positive value and facilitate relief in nearly every case.

In conclusion, it may be said that phosphorus in some form universally exists in the animal economy and the organism of plants, that an atom of phosphorus is consumed in every physical exertion, in every mental emotion, every intellectual operation, and that the more active these are the more rapidly the consumption of phosphorus. If the supply is not equal to the demand, the system is by this consumption drained of the phosphoric elements, and the functions which the elements sustain is weakened or deranged in proportion to the extent of the deficiency. As the nerve force transmitted by the Medulla Oblongata is employed in the functions of respiration, digestion and nutrition, a diminution of this force must necessarily produce a feeble condition of these functions. The digestion of the albuminoid constituents in the stomach is interfered with, and in the duodenum the amylaceous is not transformed into glucose, and the oleaginous not properly emulsified and fitted for absorption. Fermentation follows in the sequence, butyric acid is generated and the nutri-

tive disorders so graphically described by Bennett is produced, the albuminous condition of the blood ensues, and thus is formed the chain of morbid conditions we term Tuberculosis. The value of Kepheline has been fully proven. If, however, the nutritive functions be strong, and the brain more feebly organized, the lesion will be evinced in loss of brain power, insanity, loss of memory and diminished intellectuality. The indication is to remove the cause, deficient supply of hypophosphites; this is more successfully accomplished by the Kepheline than by any other known agent.

Kepheline is also valuable in the convalescence from serious and wasting diseases, they stimulate cell life, excite tissue regeneration, and tone up the nervous system. That irritable disposition, loss of power of attention, sense of exhaustion, rapidly disappear under the use of Loefflund's Extract of Malt, and Glycerite of Kepheline. We find in them a nice substitute for the more disagreeable tonics, as colombo, gentian and quinia. The Malt, Iron and Quinia combined with Kepheline forms so perfect a combination that it seems to us nothing more could be desired in the way of a perfect tonic.

Insomnia is very often the consequence of nervous exhaustion. People do not sleep because the nervous system and brain is not supplied with their proper pabulum, the hypophosphites. In a large number of such cases we have given the Kepheline and have not noted a single failure.

The following is determined to be the composition of one hundred parts.

Isolated Hypophosphite of Ammonium,	parts,	8
“ “ Potassium,	“	5
“ “ Sodium,	“	5
“ “ Calcium,	“	8
“ “ Magnesium,	“	3
Glycero Hypophosphorus Acid,	“	5
Isolated “ “	“	5
Glycerine, C. P.,	“	60

The dose ranges from ten to thirty drops. The physician should begin with ten drops and increase the dose to twenty, if it does not stimulate the brain too much.

Protagon.

This preparation differs from Glycerite of Kepheline in containing all the phosphorized principles of wheat and animal brain, in perfect and permanent solution. As a remedy in tuberculosis, nervous exhaustion and loss of virile power, it has not given as high degree of satisfaction as Kepheline. It has, however, a therapeutical field in which it is preferable, as excessive mucus discharges, as leucorrhœa, bronchitis, hemorrhoids and suppurating wounds. In the latter stage of phthisis, the two remedies combined seem superior to either.

The following is the composition of one hundred parts.

Isolated Nitrogenous Hypophosphite of Ammonium,	parts,	4
“ “ “ Potassium,	“	4
“ “ “ Sodium,	“	5
“ “ “ Calcium,	“	3
“ “ Phosphorous Compounds containing Phosphates and Phosphites of Lime, Ammonium, Magnesium and Potash,	“	6
Glycero Hypophosphorous Acid,	“	2
Pure Glycerine,	“	60

The dose is from ten to twenty drops, thrice daily.

Glycerated Wine of Wheat Phosphates or Wine of Wheat.

This is a solution of the phosphatic principles which normally reside in the inner cuticle of wheat. Experience has demonstrated that just such a preparation is required in therapeutics. While it cannot take the place of the animal hypophosphites in the diseases of adults requiring phosphates (excepting pregnant and nursing women), it is far better adapted to conditions of infantile innutrition than they.

We know the period of infancy is one fraught with imminent peril, that a very large number of all who are born succumb at this period, and we believe more than half of these can be traced to innutrition. The demand of the infantile organism is great at this period—the bones require lime and magnesium for the formation of bone, the muscles potassium for their growth and development, and the blood sodium for regulating, as shown by Baron Liebig, its phosphatic constituents. If this demand is not adequately met, constitutional derangements follow, irritation is awakened; if reflected upon the brain we witness convulsions, if upon the digestive tract, nausea, vomiting, diarrhœa and dysentery, maladies which constitute the principal outlets of infant life. By giving these wheat phosphates during dentition, we believe a large per cent. of infantile maladies would be obviated. We have given these phosphates in many cases where the consequences of innutrition were marked, and our experience has been very satisfactory. We can recall many cases in which the child was irritable, fretful, its sleep very much interrupted, the occiput abnormally warm, fontanelles often depressed. To such I have given the Wine of Wheat, with very marked benefit. Restlessness, perverseness of temper, inability to sleep, have all passed away under the use of this powerful nutrient tonic. We have often given the Wine of Wheat in difficult dentition, and in every case it has produced positive evidences of its efficacy—the indications of difficult dentition pass away, the teeth progress without further difficulty, and the vitality of the child very much enhanced. All children who evince a scrofulous diathesis, should use the Wheat Phosphates freely. The Wine will prove more effective in dissipating this diathesis than any therapeutical agent known. With Lœfflund's Extract of Malt and Infant Food, it forms a combination exceeding all others in infantile, innutrition, associated with scrofula.

Pregnancy and lactation, producing the consequences pointed out so graphically by the Editor of the *Virginia Medical Monthly*, an authority second to none in Medical Literature, demands a resupply of phosphates in an assimilable form, and no form of phosphorous preparations meet this want so admirably as the Wine of Wheat.

The dose for a child under ten years of age, is from a half teaspoonful to a teaspoonful, three times a day; for an adult, from a dessertspoonful to a tablespoonful, thrice daily.

Respectfully submitted,

CHARLES G. POLK, M.D.,

2349 Catharine Street, Phila.

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(DIGESTIVE FLUID.)

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The value of this combination is recognized by every physician, and where a tonic effect is desired, there is no more valuable remedy. The stimulating properties of the Wine, with the nutriment of the Beef and tonic effect of the Iron, render it peculiarly efficacious in the various diseases for which it is specially recommended. In its action it **strengthens the stomach, supplies food which readily assimilates, furnishes the necessary elements and warmth for an exhausted and wasted body, rapidly building up the entire system and renovating shattered and enfeebled constitutions.** In cases of general weakness, induced by overwork, or the result of disease where the system is broken down by slow fevers or other ailments, it is very beneficial.

The usual dose is one tablespoonful, containing two grains of Citrate of Iron and the virtues of one ounce of Beef.

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Having been the *first* to introduce DAMIANA, my extended experience enables me to manipulate the drug more successfully than any of my competitors; and being the only *bona fide* importer of DAMIANA engaged in the manufacture of the Fluid Extract, enables me to undersell all others.

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NOTE.—After having failed to derive any satisfactory results from the use of the Fluid Extract of Damiana, made by several parties, I lost all confidence in the remedy. At the request of Dr. F. O. St. Clair, I tested his Fluid Extract of Damiana, and was both surprised and delighted at the results. As a tonic in debility of the Genito Urinary Organs, it far surpasses every other article of the *Materia Medica*. The physiological property which renders it so effective in this class of diseases, an especial invigorator of nerve cell force, gives it a high place in all diseases, in which nerve cell innutrition sustains the position of a factor or a consequence.

(See paper on Damiana in the *Medical Brief*, June, 1878, p. 122.)

C. G. POLK, M.D.,

Late Professor of Chemistry in the Pennsylvania College of Pharmacy.